

A Case of Traumatic Cervical Braun-Sequard Syndrome

Dae Hyun Cho, M.D., Seung Hwan Lee, M.D., Jae Gil Lee, M.D., Ph.D.,
Myung Jae Jung, M.D.

Division of Critical Care and Trauma Surgery, Department of Surgery, Yonsei University
College of Medicine, Seoul, Korea

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A traumatic Braun-Sequard syndrome of the cervical spine is reported in a 53-year-old male. The patient recovered spontaneously over several days with surgical intervention. The diagnosis was made on magnetic resonance imaging with physical examination, which also demonstrated subsequent resolution of bone marrow intensity. The etiological factors of spinal Braun-Sequard syndrome are reviewed.

Keywords: Trauma; Braun-Sequard syndrome; Magnetic resonance imaging

Correspondence to

Myung Jae Jung, M.D.

Division of Critical Care and Trauma Surgery,
Department of Surgery, Yonsei University
College of Medicine, 50-1 Yonsei-ro, Seo-
daemun-gu, Seoul 03722, Korea
Tel: +82-2-2228-2100
Fax: +82-2-313-8289
E-mail: mjjung0606@yuhs.ac

INTRODUCTION

Post-traumatic Brown-Sequard syndrome has been well described in the literature. The classical syndrome, which is the consequence of hemi section of the spinal cord, consists of ipsilateral weakness and loss of proprioceptive and vibratory sensation on the same side, due to disruption of the corticospinal tracts and dorsal columns, respectively. Loss of pain and temperature sensation occurs on the contralateral side because the involved spinothalamic tract carries these modalities of sensation from the opposite side. The purpose of this case is to report a Braun-Sequard syndrome after blunt multiple trauma at a relatively late stage.

CASE REPORT

A 53-year-old male presented to our trauma center via emergency medical service. He had fallen down from bicycle to road at midnight forward with loss of consciousness, striking the left side of his head. He had no significant past medical history or allergies to medications. The patient was evaluated at the emergency room (ER) about multiple

traumas as a Trauma Critical Pathway patient. At the time of ER visit, no suspicion of spinal cord injury was seen in the physical examination.

The patient had pan facial fracture (Fig. 1), subdural hematoma, multiple extremity bony fracture and spondylolisthesis C6 over 7 (Fig. 2). Eight hours after he visited, the patient he appealed right-sided lower extremity weakness. The neurologic examination at that time revealed right arm and leg weakness, Babinski sign, Lt. Pinprick sensation weakness. Suspected spinal cord-cervical myelopathy clinically he underwent emergency magnetic resonance imaging (MRI) scan. In MRI scan, it was revealed that signal change due to cord contusion in C6-7 (Fig. 3). Two days after consultation in neurosurgery, the patient underwent anterior cervical discectomy and fusion, between C-spine 6 and 7. He got intensive care unit care for two days after surgery. He was given 10 mg of dexamethasone for 4 days after neurosurgery. Twelve days after visited emergency department, open reduction with micro plate, miniplate fixation & closed reduction about lateral orbital rim fracture, left zygomatico-maxillary fracture, and nasal bone fracture. On post operative day #4, we took MRI scanning for follow up evaluation, In that study we identified decreased intensity of bone marrow between C6 and

C7 (Fig. 4). He was transferred for rehabilitation and has gained gradual sensitivity and motor function.

DISCUSSION

Braun-Sequard syndrome was characterized by motor deficit ipsilateral to the injury combined with contralateral sensory deficit. Most of these patients gain partial recovery with bowel and bladder continence and usually walking ability. It was known rare unilateral incomplete spinal cord injuries following as the sequel of the trauma due to penetration injury. This syndrome is named for Charles Edouard Brown-Sequard (1817-1894), who delineated the sensory pathways in the spinal cord such injury might inflict respiratory failure and hemodynamic compromise. On the other hand, hypoxemia and hypotension might increase the chance for secondary cord injury and worsening the neurological outcome. Lateral cervical plain radiographs in the resuscitation area cannot rule out unstable cervical spine injury (CSI). MRI is the most sensitive imaging method for evaluation of the neck structure, including soft tissue (ligaments, discs, etc.) and neural structures. However, its relatively low availability and the technical problems of scanning trauma patients

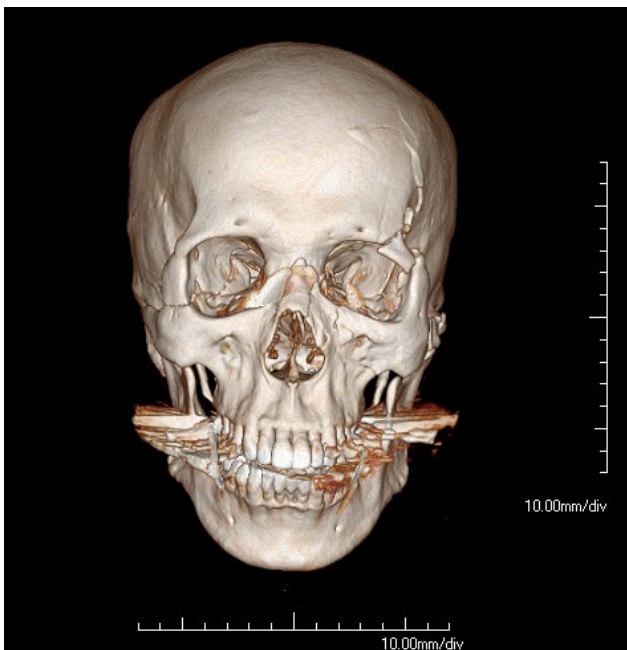


Fig. 1. Facial bone 3D CT showed panfacial fracture. CT: computed tomography.



Fig. 2. C-spine CT showed spondylolisthesis C6 over C7. CT: computed tomography.

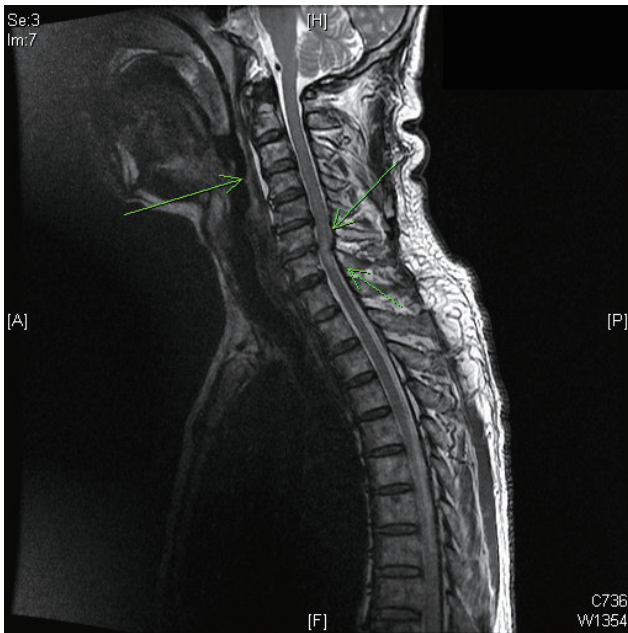


Fig. 3. Initial MRI scan showed bone marrow edema in C6 and C7 vertebral bodies. MRI: magnetic resonance imaging.

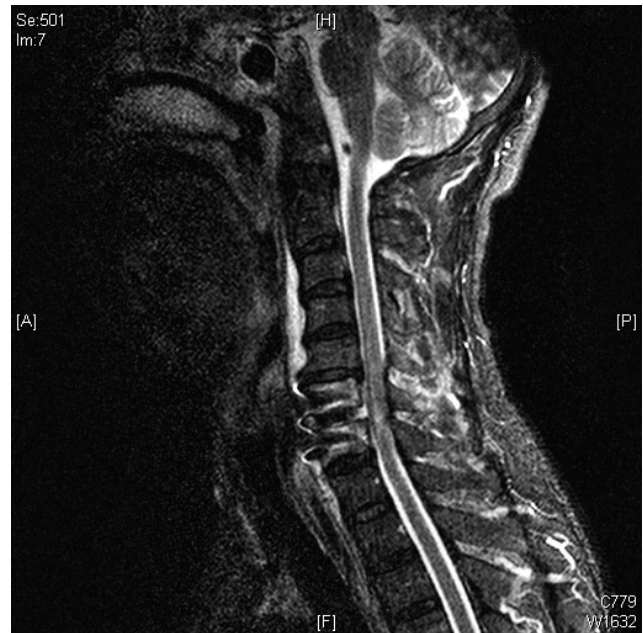


Fig. 4. On postoperative day #4 the intensity of T2 signal was decreased.

in the acute phase preclude its routine use in the initial evaluation.

There was no statistically significant correlation between the timing of thoracolumbar surgery and the complication rate. Lim et al. [1] reported a case that treated conservatively with IV dexamethasone and oral prednisolone for a week. He said that surgical treatment was not considered as the patient had only mild neurological deficits and the expected benefits would not have outweighed the risks. Wirz et al. [2] said that there is no difference in the functional recovery between Brown-Sequard syndrome and central cord syndrome subjects over the first 6 months after an CSI, although spinal tracts were differentially affected. Masuzawa et al. [3] presented Although spinal cord herniation is a very rare complication of extradural arachnoid cysts or iatrogenic meningoceles without trauma, it should be considered as a differential diagnosis when there are symptoms of spinal cord derangement not associated with a subarachnoid block. And Kobayashi et al. [4] suggested that rapid diagnosis by MRI should be provided followed by spinal cord decompression using an anterior approach. Clatterbuck et al. [5] also insisted that in these patients, anterior decompressions may provide the safest route by which to remove intradural fragments.

Bahman Jabbari argued rapidly progressive myelopathy of Brown-Sequard type (even in young individuals) is not an infrequent presenting feature of cervical spondylosis [6]. Safwat A presented seven patients with Brown-Sequard syndrome due to cervical disc herniation presented with Brown-Sequard syndrome had been treated surgically as one of them treated with anterior cervical discectomy and three patients treated by anterior cervical discectomy and fusion while three of them have been treated by posterior laminectomy. He also insisted early diagnosis and anterior decompression is important [7].

In conclusion, Brown-Sequard syndrome due to cord syndrome is not common sequel of trauma patients. Imaging is necessary to rule out cord hemorrhage or vascular injury and to clinically correlate cord damage with repeated physical examination findings and expected functional impairments. If suspected cord compression, early surgical treatment should be considered in consultation with neurosurgeons.

REFERENCES

1. Lim E, Wong YS, Lo YL, Lim SH. Traumatic atypical Brown-Se-

- quard syndrome: case report and literature review. *Clin Neurol Neurosurg* 2003;105:143-5.
2. Wirz M, Zörner B, Rupp R, Dietz V. Outcome after incomplete spinal cord injury: central cord versus Brown-Sequard syndrome. *Spinal Cord* 2010;48:407-14.
 3. Masuzawa H, Nakayama H, Shitara N, Suzuki T. Spinal cord herniation into a congenital extradural arachnoid cyst causing Brown-Séquard syndrome. Case report. *J Neurosurg* 1981;55:983-6.
 4. Kobayashi N, Asamoto S, Doi H, Sugiyama H. Brown-Séquard syndrome produced by cervical disc herniation: report of two cases and review of the literature. *Spine J* 2003;3:530-3.
 5. Clatterbuck RE, Belzberg AJ, Ducker TB. Intradural cervical disc herniation and Brown-Séquard's syndrome. Report of three cases and review of the literature. *J Neurosurg* 2000;92(2 Suppl):236-40.
 6. Jabbari B, Pierce JF, Boston S, Echols DM. Brown-Séquard syndrome and cervical spondylosis. *J Neurosurg* 1977;47:556-60.
 7. Abouhashem S, Ammar M, Barakat M, Abdelhameed E. Management of Brown-Sequard syndrome in cervical disc diseases. *Turk Neurosurg* 2013;23:470-5.